WHAT IS CLAIMED IS:

1. An imaging method, comprising the following steps of:

providing an image sensor, the image sensor comprising a photosensitive pixel array and a filter arranged on the photosensitive pixel array, the filter comprising a filter cell array, and each filter cell covering a plurality of photosensitive pixels to form a merged pixel; and

reading outputs of the photosensitive pixel array, and adding the outputs of the photosensitive pixels of the same merged pixel to obtain a pixel value of the merged pixel, thereby producing a merged image; wherein the imaging device comprises a register, each filter cell covering 2*2 photosensitive pixels;

the step of reading further comprises:

gathering and storing the outputs of the photosensitive pixels of rows k and k+1 into the register, wherein k=2n-1, n is a natural number, k+1 is less than or equal to the total row of the photosensitive pixels; and

extracting the outputs of the photosensitive pixels of rows k and k+1 from the register, and adding the outputs of the photosensitive pixels of the same merged pixel to obtain a pixel value of the merged pixel.

2. The imaging method of claim 1, wherein the step of reading further comprises:

converting analog signal outputs of the photosensitive pixels into digital signal outputs.

3. An imaging device, comprising:

an image sensor, the image sensor comprising:

a photosensitive pixel array;

a filter arranged on the photosensitive pixel array, the filter comprising a filter cell array, each filter cell covering a plurality of photosensitive pixels to form a merged pixel; and

an image processing module coupled with the image sensor, and the image processing module configured to read outputs of the photosensitive pixel array, and add the outputs of the photosensitive pixels of the same merged pixel to obtain a pixel value of the merged pixel, thereby producing a merged image;

the imaging device further comprises a register and a control module, wherein the control module is configured to sequentially gather the outputs of the photosensitive pixels of rows k and k+1, which are completed by current exposure, and store the outputs

into the register, in which k=2n-1, n is a natural number, and k+1 is less than or equal to the total row of the photosensitive pixel array.

4. The imaging device of claim 3, wherein the image sensor comprises a CMOS sensor.

5. The imaging device of claim 3, wherein the filter cell array comprises a Bayer array.

6. The imaging device of claim 3, wherein each filter cell covers 2*2 photosensitive pixels.

7. The imaging device of claim 3, wherein the control module is configured to control the line-by-line exposure of the photosensitive pixel array.

8. The imaging device of claim 3, wherein the image sensor comprises an analog-to-digital converter, each photosensitive pixel is connected to an analog-to-digital converter, the analog-to-digital converter is configured to convert analog signal outputs of the photosensitive pixels into digital signal outputs;

the digital signal outputs are configured to be stored in the register;

the image processing module is configured to add the digital signal outputs of the photosensitive pixels of the same merged pixel to obtain a pixel value of the merged pixel.

9. The imaging device of claim 3, wherein the image sensor comprises a micro-lens array arranged on the filter, and each micro-lens corresponds to a photosensitive pixel.

10. An electronic device, comprising:
the imaging device of any one of claims 3-9.

11. The electronic device of claim 10, wherein the electronic device comprises a cell phone.

12. The electronic device of claim 11, wherein the imaging device comprises a front-facing camera of the cell phone.

13. The electronic device of claim 10, wherein the electronic device comprises a central processing unit and an external storage connected to the imaging device, and the central processing unit is configured to control the external storage to store the merged image.

14. The electronic device of claim 10, wherein the electronic device comprises a central processing unit and a display device connected to the imaging device, and the central processing unit is configured to control the display device to display the merged image.

15. The imaging device of claim 7, wherein the control module is connected to a row selection logic unit and a column selection logic unit, the row selection logic unit and the column selection logic unit are connected to a switch tube corresponding to each of the photosensitive pixels, and the control module is configured to control the row selection logic unit and the column selection logic unit to select a switch tube of the photosensitive pixel at a specific position.

16. The electronic device of claim 13, wherein the external storage comprises a SM (Smart Media) card and a CF (Compact Flash) card.

17. The electronic device of claim 14, wherein the display device comprises an LED display.

18. The electronic device of claim 10, wherein the image processing module comprises an image signal processing chip.